

## **Laura C. Schmitt PT, PhD**

Given the complexities of human movement, the study of biomechanics relies on an interdisciplinary approach. The “depth” and “breadth” of expertise and information needed to enhance understanding of human movement, related pathology, and promising treatment interventions may act as both “a blessing and a curse.” In order to optimize the impact of the biomechanics field, a balance of disciplinary expertise and trans-domain research and collaboration is needed. Further, the application of biomechanics research must be translated into the “front lines” of clinic settings.

### **Investigate the interaction between joint/body mechanics and intervention strategies.**

While a variety of interventions may be successful and suitable for altering mechanics and symptoms in the short-term, we have limited information regarding the influence of interventions on long-term joint mechanics and in turn, the influence of mechanics on injury and disease processes. To date, biomechanical mechanism studies have not been tightly coupled with long-term clinical outcomes. To address this gap, fostering multi-disciplinary research teams that focus on longitudinal studies in real patient populations is important. This research approach will facilitate validation of proposed mechanisms of injury and pathology. Funding of collaborative research teams across biomechanical and clinical domains will allow for the incorporation of multi-factorial pathological approaches into mechanisms of injury and disease that will allow for the development of appropriate intervention strategies.

### **Focus on the cross-over of biomechanical initiatives into clinical settings.**

Knowledge gained in the laboratory regarding injury mechanisms, disease progression and effects of treatment interventions are not always translated into the clinic or treatment interventions. Multi-disciplinary collaborations across biomechanical and clinical domains will allow for cohort and randomized controlled trials to validate injury and disease mechanisms and provide a frame-work for the development of evidence-based treatment interventions. Further, the development of clinical screening, assessment and measurement tools that do not rely on sophisticated equipment and methodology is necessary to expand investigation of large-scale patient populations, injury risk, and the efficacy of treatment interventions.

### **Promote collaborative efforts and the advancement of technology in biomechanics research.**

Incorporation of information gleaned from advanced imaging tools and joint biochemistry with joint loading and biomechanical data will provide insight and validation of injury mechanisms and disease processes. Advancing technology related to biomechanical data, such as the development of devices to measure joint mechanics or loading outside of the laboratory will enhance understanding of injury mechanisms and pathology in real patient populations and promote translation of biomechanics into clinical settings. For current methodologies, promoting recording and reporting standards of biomechanical data will facilitate trans-domain communication and collaboration.